120576-5 is a C-I-P of
120576-1

1. A probe for detecting abnormalities in an electrical device having an effective wedge depression of no more than 200 mils, comprising:

a probe core having first and second sensing end portions;

and a sense coil wound about the probe core;

wherein said probe is adapted to detect abnormalities in the electrical device in a spaced, contact-free relationship between and at least partially above opposed adjacent surfaces of portions of the electrical device, forming first and second air gaps between the first and second sensing end portions of the core and the respective opposed adjacent surfaces.

2. The probe of claim 1, wherein said probe is adapted to detect abnormalities in the electrical device in a spaced, contact-free relationship between and completely above opposed adjacent surfaces of portions of the electrical device.

3. The probe of claim 1, wherein a total of the first and second air gaps is constant.

4. The probe of claim 1, wherein the core comprises a material having high initial permeability and high resistivity characteristics.

5. The probe of claim 1, wherein the core comprises a plurality of laminated layers formed of a material having high initial permeability and high resistivity characteristics.

6. The probe of claim 1, wherein the core comprises iron.

7. The probe of claim 1, wherein the probe core includes a skirt.

8. A sensing apparatus for detecting abnormalities in an electrical device having an effective wedge depression of no more than 200 mils, comprising:

a probe having a core with sensing end portions and a coil wound about the core;

means for supporting said probe being adapted to maintain the sensing end portions of the core in a contact-free, spaced relationship between and at least partially above opposed surfaces of members which form part of the electrical device and through which leakage flux passes; and

means for moving the probe to a new location with respect to the opposed surfaces and detecting leakage flux at the new location.

9. The sensing apparatus of claim 8, wherein said probe is adapted to detect abnormalities in the electrical device in a spaced, contact-free relationship between and completely above opposed adjacent surfaces of portions of the electrical device.

10. The sensing apparatus of claim 9, further comprising means for inducing energization of the device to a predetermined level that is lower than a normal operating level.

11. The sensing apparatus of claim 10, further comprising means responsive to the probe for detecting a leakage flux which occurs between the opposed surfaces.

12. The sensing apparatus of claim 11, further comprising means for monitoring the fluctuation in probe output and determining a presence and location of a fault in response to the detection of an abnormal leakage flux fluctuation.

13. The sensing apparatus of claim 8, wherein the means for supporting the probe comprises a probe extension piece.

14. The sensing apparatus of claim 8, wherein the means for moving the probe comprises a carriage on which the probe is suspended, the carriage being adapted to move the probe to the new position by moving along a surface forming part of the device.

15. A sensing apparatus for detecting abnormalities in an electrical device having an effective wedge depression of no more than 200 mils, comprising:

a probe having a structure through which leakage flux passes, comprising:

a probe core having first and second sensing end portions; and

a sense coil wound about the probe core; and

a probe carriage, comprising:

a probe extension piece attached to the probe; and

at least one probe location adjustment screw for adjusting the location of the probe to a spaced, contact-free relationship between and at least partially above opposed adjacent surfaces of portions of the electrical device to form first and second air gaps between the first and second sensing end portions of the core and the respective opposed adjacent surfaces.

16. The sensing apparatus of claim 15, wherein said probe is adapted to detect abnormalities in the electrical device in a spaced, contact-free relationship between and completely above opposed adjacent surfaces of portions of the electrical device.

17. The sensing apparatus of claim 15, wherein the probe carriage further comprises a plurality of wheels for riding on surfaces of the electrical device normal to the opposed adjacent surfaces.

18. The sensing apparatus of claim 17, wherein the probe carriage further comprises a pair of width adjustors for adjusting the width between opposed ones of the plurality of wheels.

19. A system for detecting abnormalities in an electrical device having an effective wedge depression of no more than 200 mils, comprising:

a probe including a core formed of a material having high initial permeability and high resistivity characteristics and a coil wound about the core;

a probe carriage adapted to support the probe so that sensing portions of the core are maintained in a contact-free, spaced relationship between and at least partially above predetermined opposed surfaces of the electrical device and so that the sensing portions of the core are exposed to leakage flux produced by the electrical device which passes between the opposed surfaces and through air gaps defined between the opposed surfaces and the sensing portions of the core;

an excitation winding removably disposed with the electrical device and operatively connected with a source of excitation voltage for inducing a flux in an electrical circuit in the electrical device; and

a data acquisition system operatively connected with the excitation winding and the sensor coil for monitoring the output of the sensor and detecting faults in the electrical device which cause change in the leakage flux.

20. The system of claim 19, wherein the probe carriage further comprises a plurality of wheels for riding on surfaces of the electrical device normal to the opposed adjacent surfaces.

21. The system of claim 20, wherein the probe carriage further comprises a pair of width adjustors for adjusting the width of opposed ones of the plurality of wheels.

22. A method for detecting faults in an electrical device having an effective wedge depression depth of no more than 200 mils, comprising the steps of:

supporting a probe, having a solid core and a coil wound about the core, in a contact-free, spaced relationship between and at least partially above adjacent surfaces of members which form part of the device and through which leakage flux passes;

inducing energization of the electrical device to a predetermined level which is lower than a normal operating level for producing leakage flux;

detecting a leakage flux which occurs between the opposed surfaces using the probe;

moving the probe to a new position with respect to the opposed surfaces and detecting a leakage flux at the new position; and

monitoring the fluctuation in probe output and detecting a fault in response to the detection of an abnormal leakage flux.

23. The method of claim 22, wherein the step of energization is carried out by disposing an energization winding about a predetermined portion of the electrical device and inducing a flux in a circuit defined by a structure of the device.

24. The method of claim 22, wherein the step of moving the probe is carried out by supporting the probe on a carriage and moving the probe to the new position by moving the carriage along a surface forming part of the device.

25. The method of claim 22, wherein the step of moving the probe comprises the step of guiding the probe along in the predetermined spaced relationship with a member which is rigidly connected to, and which extends above and between, the opposed surfaces.